

FINAL EXAMINATION Community Hurricane Preparedness (IS-324)

The following final examination is designed to find out how much you have learned about hurricanes, hurricane forecasting, and decision making from this course.

Anyone with a postal zip code for the U.S. or its territories can have their exam graded and receive a certificate of completion from the Federal Emergency Management Agency's Independent Study program. After completing the course, the easiest way to take the exam is by printing this page with the exam questions and then going to

<http://training.fema.gov/EMIWeb/IS/examnotice.asp?eid=is324>

for the **electronic answer sheet**. (Alternatively, you could open two browser windows—one with this page and the other with the answer sheet.) Mark the answers corresponding to each question by clicking the answer on the electronic answer sheet.

Completing and submitting the electronic answer sheet with the required information will enroll you in the course and make you eligible for a certificate, if you score 75% or higher. To have your exam graded and to receive a certificate, you must complete the requested information, including your postal zip code, and achieve a passing grade.

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*The final examination consists of 50 questions (ignore spaces on the answer sheet higher than 50) and should take no more than 60 minutes to complete. Carefully read each question and all the possible answers before marking your responses on the **answer sheet**. Using a soft lead (#2) pencil, circle the correct line corresponding to the letter answer. There is only one correct response for each test item. You may refer to the course materials to help you answer the questions.*

1. The bigger the hurricane, the more intense it is.
 - a. True
 - b. False

2. The size of a typical hurricane is

- a. 20 miles across
- b. 50 miles across
- c. 300 miles across
- d. 500 miles across

3. Which quadrant of a hurricane has the strongest winds?

- a. Left-front
- b. Right-front
- c. Left-rear
- d. Right-rear

4. When should you be alert for hurricanes?

- a. July 1 - September 1
- b. June 1 - September 30
- c. July 1 - October 31
- d. June 1 - November 30

5. You explain to an official that a hurricane's forward speed and path can vary considerably. She asks why and you respond:

- a. Hurricanes are affected by other weather patterns around the storm
- b. The forward speed is affected by ocean surface temperature.
- c. The hurricane is embedded in a constant airstream.
- d. The hurricane's winds circulate counter-clockwise.

6. What is the **main** method of taking **indirect** measurements of a tropical cyclone far out at sea?

- a. ASOS
- b. Radar
- c. Satellite
- d. Ship reports

7. Why is the United States becoming more vulnerable to hurricanes?

- a. Hurricanes are becoming more intense.
- b. Hurricanes are becoming larger and more frequent.
- c. Our ability to forecast has been declining.
- d. Increasing population in coastal areas make it more difficult to evacuate for a hurricane.

8. How far out from the hurricane's center would you generally expect to find tropical storm-force winds?

- a. 50 miles
- b. 175 miles
- c. 500 miles
- d. 600 miles

9. Which of the following choices is the greatest advantage of satellite imagery?

- a. It shows the hurricane during the night, as well as the day.
- b. It can accurately predict forward speed.
- c. It can accurately predict the intensity and movement of the storm.
- d. It can be used to estimate storm surge.

10. What hazard associated with a hurricane has caused the most loss of life in the last 30 years?

- a. High winds
- b. Tornadoes
- c. Storm surge
- d. Heavy rain

11. What is significant about the right-front quadrant of a hurricane?

- a. That quadrant only appears on Doppler radar.
- b. Storm surge is enhanced in that quadrant.
- c. Fewer tornadoes can occur in that quadrant.
- d. That quadrant usually has more rain.

12. The eye of a hurricane is forecast to come ashore at your community in 24 hours. Which one factor would LEAST influence your decision whether to evacuate areas near the coast?

- a. Anticipated storm surge
- b. Forecast intensity of the storm
- c. Probability of the forecast
- d. Size of the eyewall

13. A typical hurricane can bring:

- a. Trace of rain
- b. 1-3 inches of rain
- c. 3-6 inches of rain
- d. 6-12 inches of rain

14. A storm surge for a major hurricane is typically

- a. 50-100 miles wide
- b. 100-150 miles wide
- c. 1-5 miles wide
- d. 1-20 miles wide

15. A developer wants to build a hotel on an offshore island. He believes the location is high enough above sea level to avoid storm surge flooding. Which of the following would NOT aggravate storm surge effects and cause flooding problems?

- a. Coastal slope
- b. Storm intensity
- c. Tides
- d. The type of building construction

16. What tool is used by FEMA to assess storm surge threat?

- a. HURREVAC
- b. Saffir-Simpson scale
- c. SLOSH
- d. HURRTRACK

17. A coastline has a shallow slope. The type of storm surge damage will mainly be

- a. Flooded coastal communities
- b. To ships and marinas in harbor
- c. Caused by tsunami waves
- d. The result of tornadoes

18. Meteorologists tell you that a Category 2 hurricane will make landfall within 24 hours in your area and to expect an 8 to 12 foot storm surge. What **primary** rule should guide your evacuation decisions at this point?

- a. Begin evacuations when the tropical storm-force winds arrive.
- b. Evacuate immediately when the probability forecast is 25% or greater.
- c. Maintain contact with the NHC for advice.
- d. Plan for a hurricane one category higher.

19. As a hurricane approaches your coastline, its forward speed decreases from 20 kt to 10 kt. What is the significance of that?

- a. Higher wind speeds and enhanced storm surge
- b. Less total rainfall from a weakening system
- c. More total rainfall from a slower moving storm
- d. Shorter period under high winds

20. What is the principal inland hazard from a hurricane?

- a. Flash flooding from heavy rain
- b. Storm surge flooding
- c. Tornadoes from intensifying vorticity
- d. Wind damage from high-velocity sustained winds

21. A hurricane's rainbands are sweeping your community well in advance of a hurricane. In addition to the heavy rain, the main threat from these rainbands is

- a. Lightning
- b. Storm surge
- c. Reduced visibility

d. Tornadoes

22. How soon after a hurricane makes landfall is it no longer a flooding threat?

- a. After the winds drop below 74 mph
- b. After the winds drop below tropical storm-force speed
- c. 12 hours after landfall
- d. It depends on what other weather systems it interacts with.

23. The NHC forecasts a hurricane to come ashore in 6 hours, and they assign a probability level of 15% that it will strike your community. What would be an appropriate action?

- a. At this time, the strike probability is high. Expedite evacuation.
- b. At this time, the strike probability is low. Monitor the storm.
- c. At this time, the strike probability is high and landfall is imminent. Cancel all evacuations in progress.
- d. At this time, the strike probability is low. Tell the public there is no further need to worry.

24. The NHC forecasts a hurricane eye to come ashore at your location in 72 hours, and they assign a probability level of 10% to this forecast. Should you begin to make hurricane preparations?

- a. Yes, the probability is high for this forecast period.
- b. No, the probability is low for this forecast period.

25. Why do the hurricane computer models used by NHC contain forecast error?

- a. They are based on imperfect data.
- b. They are run too frequently.
- c. They take into account long-term atmospheric changes.
- d. They do not contain forecast error—only people do.

26. A tropical storm **watch** means tropical storm conditions are:

- a. Expected within 24 hours
- b. Expected within 36 hours

- c. Possible within 24 hours
- d. Possible within 36 hours

27. A hurricane **warning** means hurricane conditions are:

- a. Expected within 36 hours
- b. Expected within 24 hours
- c. Possible within 24 hours
- d. Possible within 36 hours.

28. Who coordinates information requests between emergency managers and the National Hurricane Center?

- a. Hurricane Liaison Team
- b. Miami Weather Forecast Office Operations
- c. Technical Support Branch
- d. Tropical Analysis and Forecast Branch

29. What agency disseminates watches and warnings for tropical storms and hurricanes?

- a. Local Weather Forecast Offices
- b. Miami Weather Forecast Office Operations
- c. National Hurricane Center
- d. Tropical Analysis and Forecast Branch

30. What agency disseminates watches and warnings for **inland** high winds?

- a. Miami Weather Forecast Office Operations
- b. Local Weather Forecast Offices
- c. National Hurricane Center
- d. Tropical Analysis and Forecast Branch

31. To get the current and predicted effects of the hurricane for your local area, you should?

- a. Read the latest tropical cyclone public advisory
- b. Talk with the Hurricane Liaison Team at the National Hurricane

Center

- c. Read the hurricane local statement
- d. Read the tropical cyclone discussions

32. If you wanted to determine where you were in relation to the wind fields, which product would you look at?

- a. Special public tropical cyclone advisories
- b. Tropical cyclone discussions
- c. Tropical cyclone strike probability forecasts
- d. Tropical cyclone forecasts and advisories

33. If you wanted to get a sense of the forecasters' confidence in the models, which product would you look at?

- a. Public tropical cyclone advisories
- b. Tropical cyclone discussions
- c. Tropical cyclone forecasts and advisories
- d. Hurricane local statements

34. What product tells **when** tropical storm-force winds (40-mph) can be expected to arrive?

- a. Public tropical cyclone advisories
- b. Tropical cyclone forecasts and advisories
- c. Tropical cyclone strike probability forecasts
- d. WFO hurricane local statements

35. Which is NOT a source of forecast error?

- a. Incomplete understanding of atmospheric physics
- b. Not enough observations
- c. Radar images
- d. Observation inaccuracies

36. At 0900Z, a tropical cyclone advisory contains the following information:

FORECAST VALID 24/1800Z 21.9N 78.1W
MAX WIND 65 KT...GUSTS 80 KT
64 KT... 30NE 0SE 0SW 0NW
50 KT...100NE 100SE 30SW 30NW
34 KT...135NE 125SE 75SW 125NW

What does the information tell you?

- a. The current wind speed
- b. The past intensity of the hurricane at various times
- c. The predicted speed of the hurricane
- d. The radii of the wind fields 9 hours from now

37. At 0900Z, a tropical cyclone advisory contains the following information:

PRESENT MOVEMENT TOWARD THE WEST NORTHWEST OR 300 DEGREES
AT 10 KT

ESTIMATED MINIMUM CENTRAL PRESSURE 992 MB
MAX SUSTAINED WINDS 65 KT WITH GUSTS TO 80 KT
64 KT..... 30NE 0SE 0SW 0NW
50 KT.....100NE 100SE 30SW 30NW
34 KT.....135NE 125SE 75SW 125NW

ALL QUADRANT RADII IN NAUTICAL MILES

If you are 225 nautical miles northwest of the storm and this hurricane is moving in your direction, how long before tropical storm-force winds (34 kt) reach you, if the storm retains its current characteristics?

- a. 6.5 hours
- b. 10 hours
- c. 2 hours
- d. 20 hours

38. Why is the hurricane warning area usually 300 miles wide?

- a. That's how large the average hurricane is

- b. To reflect possible errors in the track forecast
- c. Because the tropical storm force-winds extend out 300 miles
- d. To reflect possible errors in the intensity forecast

39. What is a critical source of information about community resources, behavior, and hazards that go into the hurricane sections of a community's Emergency Operations Plan?

- a. HURREVAC
- b. National Hurricane Center
- c. Hurricane Evacuation Study
- d. National Weather Service

40. What is the most critical component of coordination between agencies?

- a. Sequencing of actions to prevent interference and inconsistency
- b. Contacting the Department of Transportation to finish repairs prior to the arrival of 40-mph winds
- c. Distribution of all agency plans to one another
- d. Training Emergency Operations Center staff on specific duties

41. What does the computer program HURREVAC do?

- a. Used by hurricane specialists at the NHC to produce forecasts
- b. Calculates flooding potential depending on slope of continental shelf
- c. Graphically displays tropical cyclone and evacuation data
- d. Models the atmospheric forces that cause hurricanes

42. In order to assure there is enough time to evacuate a community, the evacuation should start when

- a. The hurricane is predicted to intensify.
- b. Tropical storm-force winds are 36 hours from your location.
- c. Hurricane-force winds are 48 hours from your location.
- d. When the tropical storm-force winds intersect the HURREVAC decision arc.

43. When should an evacuation be under way?

- a. After the arrival of hurricane-force winds
- b. After the arrival of 40-mph winds but before hurricane-force winds
- c. At the arrival of 40-mph tropical storm-force winds
- d. Before the arrival of 40-mph tropical storm-force winds

44. When should you aim to have an evacuation be completed?

- a. After the arrival of hurricane-force winds
- b. After the arrival of 40-mph winds but before hurricane-force winds
- c. By the time the 40-mph tropical storm-force winds arrive
- d. Before the arrival of hurricane-force winds

45. The tropical storm-force winds of a Category 3 hurricane are forecast to intersect the decision arc for your community in 36 hours. For a hurricane of Category 4 intensity, it is estimated that your community will need 20 hours to evacuate to safety. How much time is there before the evacuation should be started?

- a. 36 hours
- b. 20 hours
- c. 16 hours
- d. 56 hours

46. The eye of a Category 2 hurricane is 450 nautical miles away and forecast to come ashore at your coastal location. The tropical storm-force winds extend 150 nautical miles. The hurricane is moving at 15 knots. If it maintains forward speed, how long before tropical storm-force winds begin to affect your community?

- a. 20 hours
- b. 10 hours
- c. 24 hours
- d. 30 hours

47. Using the information in the previous problem, if the hurricane's forward speed increases to 20 knots, how long before tropical storm-force winds begin to affect your community?

- a. 20 hours

- b. 10 hours
- c. 15 hours
- d. 30 hours

48. Using the information in Question 46 (forward speed remains 15 knots), and assuming it takes 18 hours to evacuate your jurisdiction, when is the best time to call for an evacuation?

- a. Now
- b. 4 hours
- c. 15 hours
- d. 5 hours

49. Errors in forecasting the forward speed of the hurricane can affect

- a. The number of people to evacuate
- b. Time available before onset of 40-mph winds
- c. The radius of the tropical storm-force winds
- d. The size of the rainbands

50. If a hurricane is on course for your community, and it suddenly intensifies and gains forward speed. What are the results?

- a. Decision arc expands
- b. Decision arc shrinks
- c. Fewer people must be evacuated
- d. More time to complete evacuations